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### (54) Digital over-the-air entertainment and information

(57) A system of distributing electronic content includes a satellite (14) and a network operations center (12) uplinking electronic content to the satellite. The electronic content may contain advertising and various other information including television, movies, and music. An over-the-air broadcast center (16) receives the electronic content from the satellite (14) and generates

over-the-air electronic content. A user device (18) is used to receive the over-the-air electronic content. The user device may filter the electronic content broadcast by the over-the-air broadcast center (16) and store various information in a memory cache therein. When the user desires, the information in the memory cache may be used by the user at his convenience (Fig. 1).

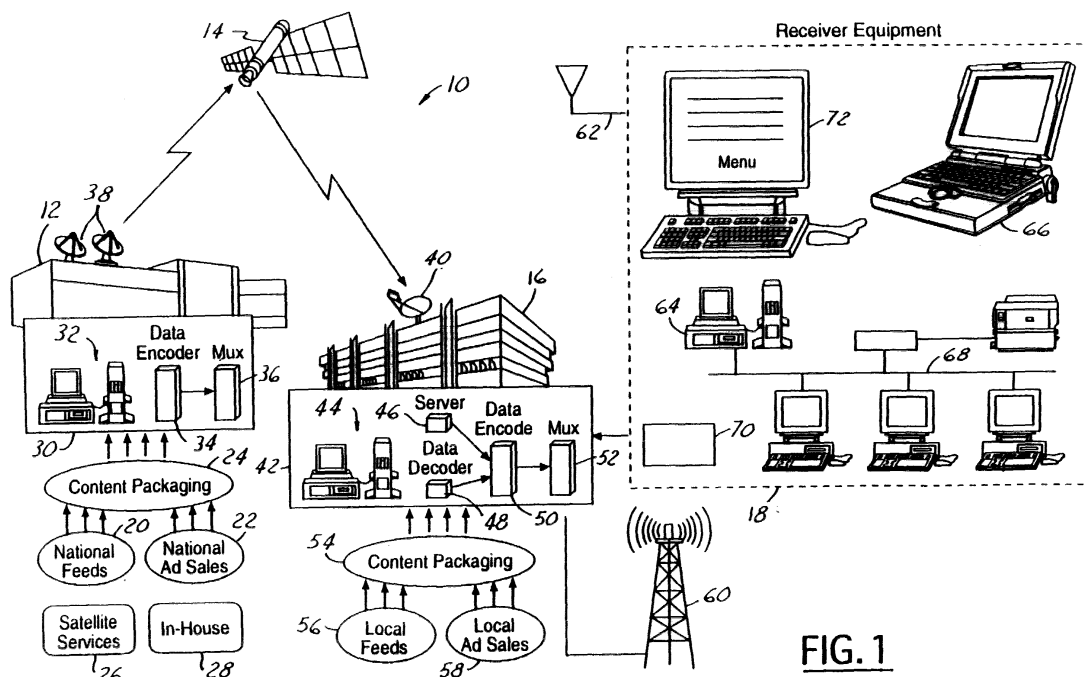


FIG. 1

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## Description

### Technical Field

[0001] The present invention relates generally to broadcasting digital information, and more specifically, to distributing and selling electronic content to a target market.

### Background Art

[0002] Hughes Electronics Corporation provides digital direct broadcast systems such as DIRECTV® and DIRECPC™ that broadcast via satellite, television programs and information or computer applications, respectively. DIRECTV® broadcasts television programming in a similar fashion to that of terrestrial television. DIRECPC™ subscribers place requests that are queued up and broadcasted, to the subscriber's computer. DIRECPC™ services on-demand requests. DIRECTV® and DIRECPC™ incorporate encryption in addressing for applications such as on-demand requests. These systems provide access control where users make selection decisions in advance of the content being broadcast.

[0003] Another type of system, described in U.S. Patent 5,790,935, issued to the present assignee, is a virtual on-demand digital information delivery system. In this system, a central distribution server directs a variety of programs to various users based upon a filtering predictive scheme located at the subscriber's local storage. During off peak hours various programs are downloaded to the subscriber's local storage.

[0004] The systems described above are all satellite-based systems. That is, each of the systems deliver content directly from a network operations center to a satellite which broadcasts the information to the users. Such systems, however, require the placement of a satellite dish on the building in which the service is used. The satellite dishes must be positioned in a location on the building so that they are positioned toward the geostationary satellite generating the broadcast signals. If the "view" to the satellite is blocked by trees or other buildings, the service cannot be used. Also, some consumers view the satellite dishes as not aesthetically pleasing.

[0005] Broadcast systems are typically not used for point-to-point information delivery services because many people must receive the same content at the same time in order for it to be cost effective. It would therefore be desirable to provide an over-the-air broadcast system to provide point-to-point information.

### Summary Of The Invention

[0006] It is therefore one object of the present invention to provide a system that combines satellite broadcasting with over-the-air broadcasting to bring service

to both fixed and mobile users.

[0007] In one aspect of the invention, a system for distributing electronic content comprises a satellite and a network operations system that uplinks electronic content to the satellite. An over-the-air broadcast system receives electronic content from the satellite and generates over-the-air electronic content signals. A user appliance receives the electronic content for use by the user. In a further aspect of the invention, the user appliance has a cache and a filter therein. The electronic content is broadcast with affinity information so that the filter may select the electronic content based on the affinity information. Thus, only the electronic content likely desirable for the particular user is stored.

[0008] In a further aspect of the invention, a method for distributing electronic content comprises the steps of:

- uplinking a plurality of electronic content packages to a satellite;
- receiving the electronic content packages from the satellite;
- over-the-air broadcasting the electronic content packages; and
- receiving the electronic content packages through a user appliance.

[0009] One advantage of the invention is that the system may be used with fixed and mobile user devices. The user devices, because they receive over-the-air broadcasting, are lower cost than satellite-based devices.

[0010] Another advantage of the invention is that an on-demand type service may be offered in an over-the-air broadcast system.

[0011] Other objects and features of the present invention will become apparent when viewed in light of the detailed description of the preferred embodiment when taken in conjunction with the attached drawings and appended claims.

### Brief Description of the Drawings

#### [0012]

Figure 1 is a diagrammatic view of the system architecture of a system according to the present invention.

Figure 2 is a block diagrammatic view of the business interactions of the present invention.

Figure 3 is a block diagrammatic view of a user device for use in the present invention.

### Best Modes For Carrying Out The Invention

[0013] In the following figures the same reference nu-

merals will be used to identify the same components in the various views.

**[0014]** As described in this application, "electronic content" is meant to encompass various types of digital information including the distribution of music, videos, movies, music videos, games, advertising and promotional materials associated with the content.

**[0015]** Referring now to Figure 1, electronic content distribution system 10 is illustrated. Electronic distribution system 10 generally has a network operations center (NOC) 12, a satellite 14 in communication with NOC 12, an over-the-air broadcast center 16 that is coupled to users 18 over the air. The network operations center 12 is coupled to national feeds 20 and national ad sales 22 through content packaging 24. National feeds 20 may, for example, be national "cable" type services channels or satellite service such as DGR-ECPC™ or DIRECTV®. The national ad sales 22 may be derived in-house 28 or as will be further described below may be obtained from various promotional ad agencies. A content packaging block 24 is coupled to national feeds 20 and national ad sales 22. The content packaging 24 functions to couple national feeds 20 with national ad sales 22.

**[0016]** The network operations center 12 has a control system that includes various computers 32, a data encoder 34, and a multiplexer 36 that are coupled to antennas 38 that uplink electronic content to satellite 14. The control system 30 operates in a manner known to those skilled in the art.

**[0017]** Over-the-air broadcast center 16 has an antenna 40 that receives downlink signals from satellite 14. Over-the-air broadcast center 16 has a control system 42 that comprises a control computer 44, a server 46, a data decoder 48, a data encoder 50, and a multiplexer 52. Control system 42 is coupled to content packaging 54 which in turn is coupled to local feeds 56 and local ad sales 58. The over-the-air broadcast center receives downlink signals from satellite 14. Control system 42 may also receive local channel feeds through local feeds 56 and may also provide local advertising content through local ad sales 58. The local feeds 56, local ad sales 58, and downlink signals from satellite 14 are combined in control system 42. Some of the information from satellite 14 may also be stored in server 46 for on-demand broadcasting.

**[0018]** Control system 42 is coupled to a wireless transmitter 60 that broadcasts the wireless signals to users 18. Wireless transmitter 60 may comprise a cell tower such as that used in cellular phones, a TV tower that broadcasts digital signals or a stratospheric platform positioned above a predetermined metropolitan area for broadcasting over-the-air signals. If the wireless transmitter 60 comprises a TV tower, the channels broadcast may be excess channels for a metropolitan area allocated in HDTV format.

**[0019]** Users 18 are coupled to an antenna 62 used for receiving over-the-air broadcast signals. Users 18

may comprise a variety of devices such as a personal computer 64, a laptop computer 66, a network 68 or a hand-held device 70. Each of the devices is preferably coupled to its own antenna 62 for receiving over-the-air signals. Each device may have the antenna 62 coupled therein or may be connected to a separate antenna. Hand-held device 70 may comprise a variety of devices such as a digital media receiver, a personal digital assistant, or other type of hand-held device. Preferably, each device associated with user 18 has a menu 72 or other selection apparatus for selecting electronic content broadcast by over-the-air broadcast center 16. Menu 72 may provide information to the user as to the current electronic content being broadcast or may provide an interface to the electronic content stored within the user device.

**[0020]** In operation, the network operations center 12 provides a substantial amount of the content to be broadcast by the over-the-air broadcast center 16. In an actual implementation, very few network operations centers are required. Preferably, only one network operations center 12 is provided. A substantial amount of programming is uplinked to satellite 14. Satellite 14 downlinks various electronic content to over-the-air broadcast centers 16 throughout the country. The over-the-air broadcast center 16 may also combine local content and local ads through local feeds 56 and local ad sales 58. Users 18 may also be coupled to broadcast center 16. Thus, if on-demand service is desired, broadcast center 16 through telephone wires or through a wireless medium may be contacted so that the broadcast center 16 broadcasts the information through wireless transmitter 60. As will be further described below, broadcast center 16 may track data so that affinity information may be broadcast with the electronic content so that the users may filter the electronic content and store the electronic content on the user devices.

**[0021]** Referring now to Figure 2, a business level view of a electronic content distribution system 10 is illustrated according to the present invention. The electronic content distribution system 10 is centered around a system company 76. The system company 76 is responsible for the initial broadcast and uplinking of the electronic content. The system company 76 interfaces with over-the-air distribution companies 78. The over-the-air distribution companies may be cellular phone systems, television stations, or may be a company owned system. The over-the-air distribution companies are generally coupled to the end users 18 through the over-the-air broadcast.

**[0022]** System company 76 may also be coupled to various outside sources such as advertising agency 80, content providers 82, and e-commerce merchants 84. The personalization/advertising metering box 86 may represent various aspects of system company, over-the-air distribution and advertising agencies 80. Although illustrated separately, box 86 may be incorporated into these other functions. Personalization/advertis-

ing metering box 86 monitors the transactions by users 18 and helps to formulate an affinity model that is used to provide affinity information along with the electronic content to end users 18 so that material likely to be desirable to the particular end users 18 may be stored at the end users 18. The end users 18 are also coupled to transaction processing/fulfillment box 88. The transaction processing/fulfillment box 88 is shown coupled to system company 76, over-the-air distribution company 78, and e-commerce merchants 84. Although illustrated as a separate box, transaction processing/fulfillment box 88 may be incorporated into system company 76, over-the-air distribution company 78, and e-commerce merchants 84.

**[0023]** It is envisioned that end users 18 may subscribe to a predetermined service as well as being able to request certain electronic content on demand. This may be done through the menu system as described above. Upon selecting a desired electronic content from the menu, the user device may be coupled to transaction processing/fulfillment box 88 wherein the on-demand service is paid for and wherein the over-the-air distribution system 78 broadcasts the information to the end user 18. The over-the-air distribution system may also be used to provide a decryption key to end users 18 for information stored on the user devices but is encrypted.

**[0024]** Advertising agencies 80 may provide targeted advertising that is coupled to various specific content of content providers 82 to particularly target a specific market.

**[0025]** Referring now to Figure 3, a user device 88 is illustrated. Each user device 88 preferably is coupled to an antenna 62 as described above. Antenna 62 is coupled to a receiver 90 that receives the over-the-air signals and converts them into a useful format. Receiver 90 is coupled to a filter 92 that has affinity information of the user therein. Filter 92 is coupled to a memory cache 94. Memory cache 94 and filter 92 are coupled to a display 96 that is used to display menu 72. A control device 98 is coupled to display 96 to allow selections of various menu items from memory cache 94. Control 98 may also be used to select streaming street content information being received at receiver 90 through filter 92. Control 98 may, for example, be a touch pad, keyboard, touch screen or other device. Control device 98 may also be coupled to the purchasing system 100 such as transaction processing/fulfillment box 88 of Figure 2 above.

**[0026]** One advantage of the invention is that user device 88 may be mobile or fixed. That is, home users as well as mobile users such as those using hand-held devices or those with laptop computers may benefit from the system. In operation, the over-the-air broadcast center 16 broadcasts a variety of information simultaneously. Receiver 90 receives all the information and through the use of filter 92 decides whether or not to store the information in memory cache 94. The electronic content may be full rights to the electronic content.

may be an encrypted form of the electronic content, or may be an indicator for menu 72 that will allow the user to make an on-demand request for the information. Filter 92 has affinity information associated therewith so that the electronic content received by receiver 90 may be screened.

**[0027]** In a preferred embodiment, the broadcasted electronic content may contain affinity information so that the filter 92 may compare the broadcasted affinity information with the affinity information within the filter and thereby store only the potentially desirable electronic content in memory cache 94. For each item stored in memory cache 94, a menu item is displayed on display 96 so that the user may select the electronic content when desired.

**[0028]** If full rights are not given in the electronic content, the control device 98 may select purchasing the device from purchasing system 100. Thus, the receiver 90 may receive the on-demand information and/or a decryption key. The user device through menu 72 and display 96 may be also used to select various over-the-air streaming information from over-the-air broadcast center 16.

**[0029]** After purchasing the electronic content, the information may be provided to advertisers and to the network operations center 12 so that affinity information may be associated with the broadcast information. Data mining techniques may be also used at the network operations center 12 so that various affinity models may be generated to target specific audiences and markets. This information will form an affinity preference model for developing affinity preference models for content downloads. These affinity models may be periodically updated and as well, the filter terms located at the user device may also be updated.

**[0030]** While particular embodiments of the invention have been shown and described, numerous variations alternate embodiments will occur to those skilled in the art. Accordingly, it is intended that the invention be limited only in terms of the appended claims.

## Claims

1. A system (10) of distributing electronic content comprising:
  - a satellite (14);
  - a network operations center (12) uplinking electronic content to said satellite;
  - an over-the-air broadcast center (16) receiving said electronic content from said satellite and generating over-the-air electronic content; and
  - a user appliance (18) receiving said electronic content.
2. A system of distributing electronic content comprising:

a satellite (14);  
a network operations center (12) uplinking electronic content to said satellite;  
an over-the-air broadcast center (16) receiving electronic content from said satellite and generating over-the-air electronic content signals;  
said over-the-air electronic content (18) having affinity information associated therewith; and  
a user appliance (88) having a cache (94) and a filter (92) therein, said user appliance (88) receiving said electronic content and filtering said electronic content and storing said electronic content in said cache in response to filtering.

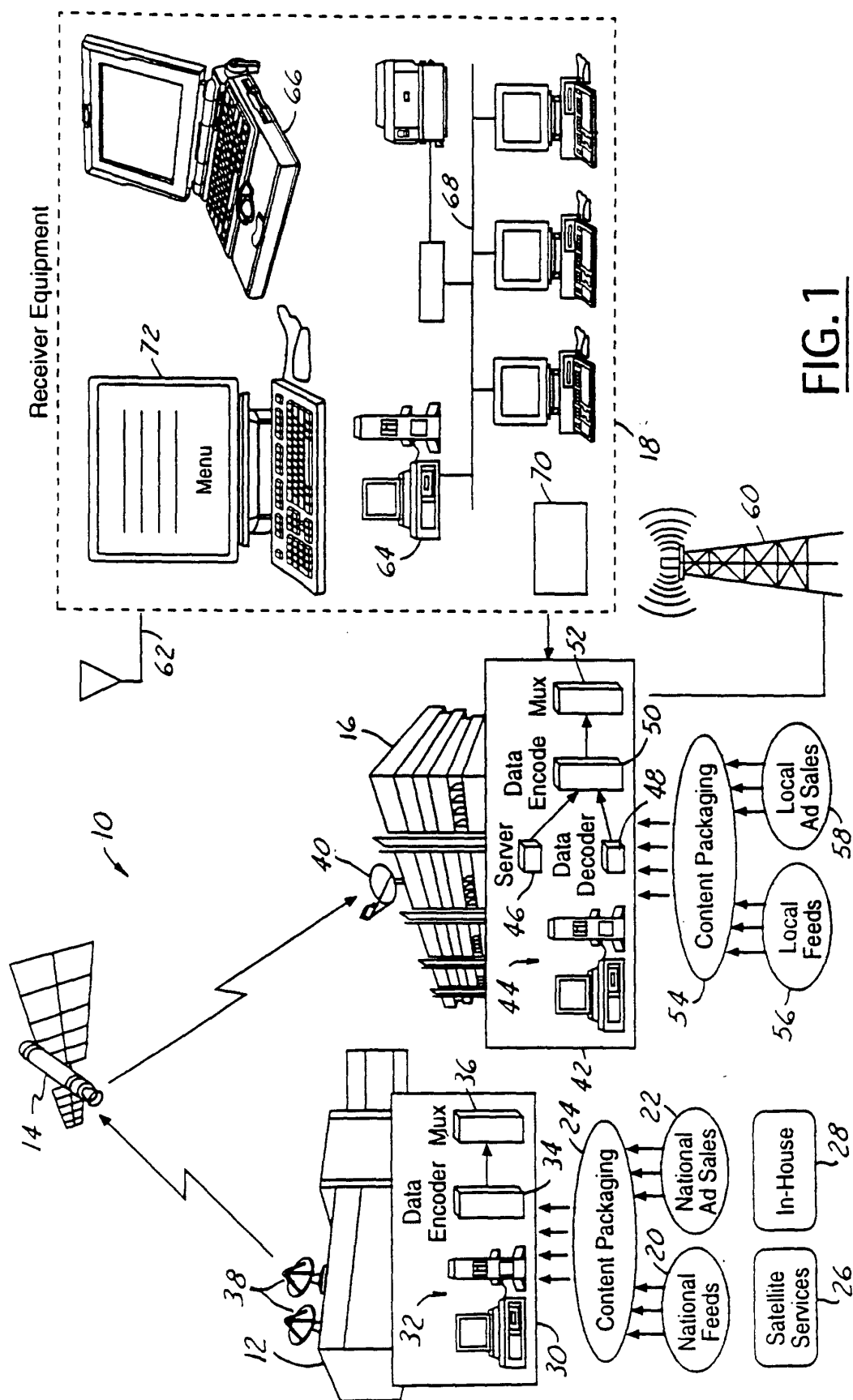
3. A system as recited in claim 1 or 2, **characterized in that** said over-the-air broadcast center (16) is coupled to a stratospheric platform.
4. A system as recited in claim 1 or 2, **characterized in that** said over-the-air broadcast center (16) is coupled to a cell tower (60).
5. A system as recited in claim 1 or 2, **characterized in that** said over-the-air broadcast center (16) is coupled to a digital TV broadcast tower.
6. A system as recited in any of claims 1 to 5, **characterized in that** said electronic content comprises digital audio signals.
7. A system as recited in claim 2, **characterized in that** said electronic content comprises video.
8. A system as recited in any of claims 1 to 7, **characterized in that** said user appliance (88) is fixed.
9. A system as recited in any of claims 1 to 7, **characterized in that** said user appliance (88) is mobile.

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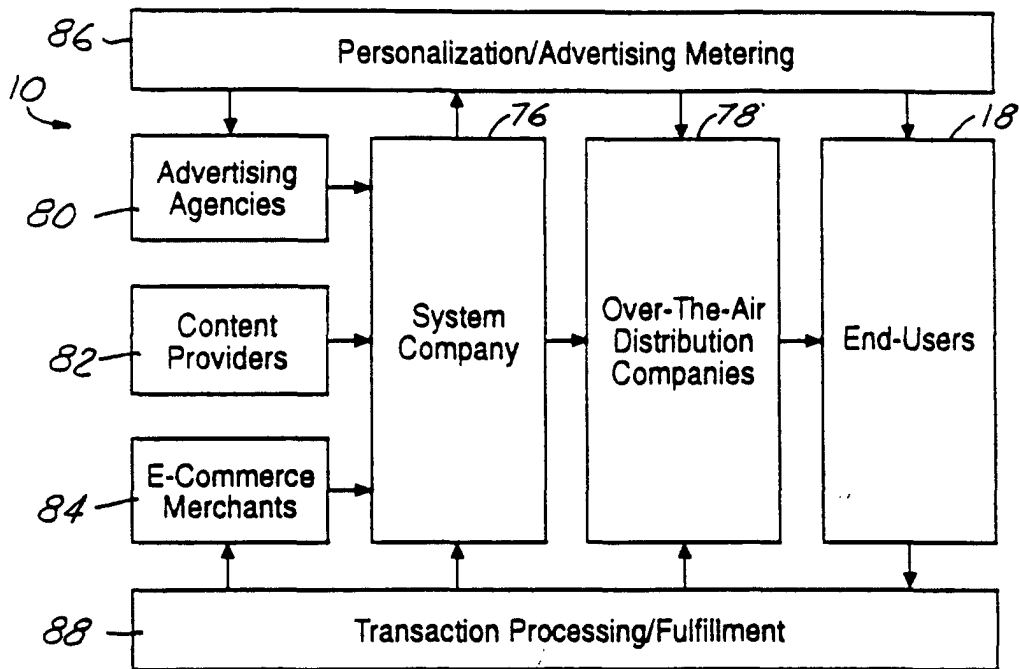


FIG. 2

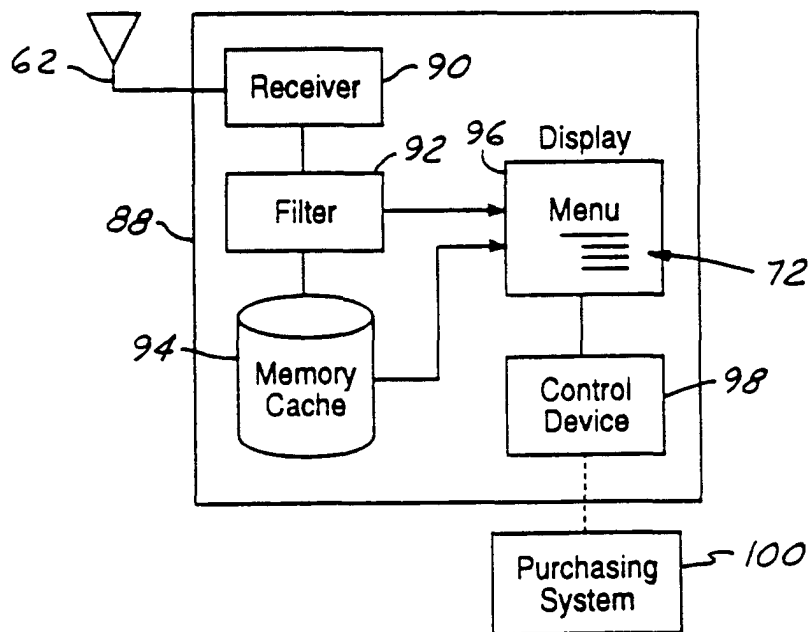


FIG. 3